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Remarks

As two claims have been cancelled and two new claims have been added, and the total number of independent claims does not exceed three, no excess claims fees are believed to be required.

With regard to the objection under 35 USC 112, it is not completely understood why the Examiner considers claim 1 to contain a negative limitation. The wording of claim 1 was carefully chosen to avoid claiming a negative limitation. The Examiner states that "certain steps are enumerated, but then omission of those steps is permitted". In the applicant's respectful submission, that is not strictly accurate. Claim 1 requires that in the manufacture of a device one first carry out the positively recited steps of predefining a set of sixteen mask steps as more fully enumerated in the claim (This step does not involve actually carrying out such steps; it merely involves defining in some way what the steps are), then identify a specific device to be manufactured, and then select a specific sequence of mask steps from the predefined set depending on the nature of the device to be manufactured. In practice, one would set up a machine capable of performing the predefined mask steps and then have the ability to make any one of the 41 devices simply by selecting the appropriate sequences from the predefined set.

For example, if one discovered in the computer field that from a limited set of program objects, a large number of programs could be designed, one could envisage a claim that included the steps of defining a set of identified objects, and selecting a subset of the identified objects from the predefined set to achieve a specific result. Such a claim might read: *A method of making a device comprising defining a set of objects A, B, C and D, each having defined properties; selecting a subset of objects from said predefined set; etc.* In the present invention claim 1 includes the step of positively selecting a sequence of mask steps from a predefined set of such steps. The applicant does not see the fundamental difference in principle from the point of view of claim drafting between a claim step consisting on the one hand of selecting a subset of program objects from a set of such objects and on the other hand of selecting a subset of steps from a predefined set of steps. Claim 1 does not say that any steps can be omitted. It merely calls for one first to predefine the set and then positively select a sequence (or subset) from the predefined set.

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Claim 1 relates to a manufacturing process for making up to 41 different devices as described in the application. An important aspect of the invention, as previously noted, is the applicant's realization that from the limited set of the sixteen mask steps defined, it is possible to make all these different devices. The nature of the mask steps forming the predefined set has been more precisely defined. For example, it has been set forth that the second mask step involves forming an active region by etching through the second mask (see Figure 18, Mask 2).

As the Examiner will appreciate, the cost of a manufacturing process is closely related to the number of mask steps required. The ability to produce a large number of devices (41 in this case) from a single predefined set of steps is critical.

Not only does the invention permit all these different devices to be made with a limited number of mask steps, the use of the inventive sequence permits these devices to be made without the use of buried layers or epitaxial layers of different doping type.

In view of the rejection under 35 USC 112, claim 1 has been amended to identify the masks using labels similar to those found in Figure 18. Also, step *a*, although it previously indicated that the masks were separate, has now been amended to make it clear that each mask is separate and distinct from the other masks in the set, thus avoiding any ambiguity as to "whether each mask is separate or if some of the claimed masks are one and the same".

The word *using* has been avoided. The claim must define the invention by including its essential elements, but it is respectfully submitted that it is not required to recite incidental steps that do not directly form part of the invention. The essential aspect of the invention is that each mask step is used to perform the activity defined. Other steps, such as surface preparation and removal of the masks, form no direct part of the invention, and need not be positively recited in the claims.

Claims 21 and 22 have been added. These claims are directed to the processes of Figures 11 and 12 and do not require any selection to take place. These claims merely recite a sequential sequence of mask steps.

The Examiner's rejected the claims as being unpatentable over Williams under 35 USC 103(a). However, Williams describes a method for forming various high voltage

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transistors in a complex starting material composed of buried layers located underneath an n-type epitaxial layer over a P-type bulk substrate. The present invention uses a single p-type starting material consisting of p-type bulk silicon or p-type epitaxial material over p-type bulk silicon (see page 11, line 11), and by following the mask sequence set forth, it is possible to make the high voltage devices while avoiding the need for the buried layers or the epitaxial layers of different doping type. The result is a substantial cost saving.

The Examiner points out that Williams starts from an n-type starting material and indicates that the p and n regions can be reversed. However, reversal of the p and n regions would result in a p-type epitaxial layer over an n-type substrate, not a bulk p-type substrate or a p-type epitaxial layer on a p-type substrate. The Examiner will note that the recited mask steps, which are now more clearly differentiated over the Williams mask steps (For example, the first mask step is clearly defined as forming an n-implant through the mask and the second mask step is defined as etching through an oxidation layer etc.) do not require the use of buried layers or the formation of further epitaxial layers of a different doping type. It is important to realize that these specific mask steps must be carried out to obtain the benefits of the invention.

In step 1, Williams forms a P-well in an n-type epitaxial layer on a p-type substrate. In the invention, an N-well is formed in the p-type substrate or the p-type epitaxial layer on the p-type substrate, thus avoiding the need for buried layers or additional epi layers.

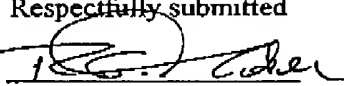
It is believed that the defined sequence of masks steps as more particularly defined is novel and represents an important advance in the art because of its ability to permit a large number of devices to be made from a single sequence of a limited number of mask steps (The mask count is kept to a minimum) and its ability to avoid the need for buried layers and a further epitaxial deposition of a second conductivity type. These arguments also apply to claims 21 and 22, which merely define a novel straight sequence of mask steps without requiring any preliminary step of defining a set of mask steps and selecting a sequence from the predefined set.


It is believed that this application is now in condition for allowance. Reconsideration and allowance are respectfully requested.

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Invention: METHOD OF MAKING HIGH-VOLTAGE BIPOLAR/CMOS/DMOS (BCD) DEVICES			
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